# CIVIL-TECH CONSULTANTS AND ENGINEERS

Building & Highway Material Testing Laboratory

An ISO 9001:2008 Certified Company

**NABL** - Accredited Laboratory as per ISO / IEC-17025 : 2005

JAS-ANZ BSCIC ISO 9001 REGISTERED


Job No.: CTCE/BBMP/W.No.07/KRIDL/WMM/S-T/2014-15 09.07.2014

## DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

| | |
|---|---|
| Customer | **Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore. |
| Agency | **Technical Manager (West),** KRIDL, Bangalore. |
| Name of Work | Improvements to Roads at Ward No.07, Byatarayanapura in Sanjeevanagara, BBMP, Bangalore. |
| Reference | AEE/(KOD.SUB.DIV)/67/A/2014-15 Dated: 26.06.2014 |
| Technical Reference | IS 2386(Part 1) 1963 (RA 2011) |
| Type of Mix | Wet Mix Macadam |
| Sample ID | WMM Layer |
| Date of Testing | 09.07.2014 |

Result : Flakiness Index = **11.35%**

Elongation Index = **13.26%**

**Result : Combined Flakiness & Elongation index 24.61%**

Comments:

Maximum allowable Flakiness & Elongation Index for Wet Mix Macadam is 30%

Note:

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# 23/14, 7th Cross, 3rd Stage,
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| Reference | AEE/(KOD.SUB.DIV)/67/A/2014-15 Dated: 26.06.2014 |
| Technical Reference | IS 2386(Part 1) 1963 (RA 2011) |
| Type of Mix | Wet Mix Macadam |
| Sample ID | WMM Layer |
| Date of Testing | 09.07.2014 |

Civil-Tech Consultants & Engineers Bangalore

Result : Flakiness Index = **11.59%**

Elongation Index = **13.42%**

**Result : Combined Flakiness & Elongation index 25.01%**

Comments:

Maximum allowable Flakiness & Elongation Index for Wet Mix Macadam is 30%

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## DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

| | |
|---|---|
| Customer | **Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore. |
| Agency | **Technical Manager (West),** KRIDL, Bangalore. |
| Name of Work | Improvements to Roads at Ward No.07, Byatarayanapura in Sanjeevanagara, BBMP, Bangalore. |
| Reference | AEE/(KOD.SUB.DIV)/67/A/2014-15 Dated: 26.06.2014 |
| Technical Reference | IS 2386(Part 1) 1963 (RA 2011) |
| Type of Mix | Wet Mix Macadam |
| Sample ID | WMM Layer |
| Date of Testing | 09.07.2014 |

Civil-Tech Consultants & Engineers Bangalore

Result : Flakiness Index = **11.83%**

Elongation Index = **13.67%**

**Result : Combined Flakiness & Elongation index** 25.50%

**Comments:**

Maximum allowable Flakiness & Elongation Index for Wet Mix Macadam is 30%

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08.07.2014

## ATTERBERG LIMITS TEST FOR WMM
## MORTH TABLE-400-11

**Client** : **Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore.

**Agency** : **Technical Manager (West),** KRIDL, Bangalore.

**Name of Work** : Improvements to Roads at Ward No.07, Byatarayanapura in Sanjeevanagara, BBMP, Bangalore.

**Reference** : AEE/(KOD.SUB.DIV)/67/A/2014-15 Dated: 26.06.2014

Date of Testing : 08.07.2014

Material : WMM

Sample Location : WMM Mix Plant

As per MORTH Table 400-11

| Sl. No. | Particulars | Test Results | Standards as per Specifications |
|---|---|---|---|
| 1 | Liquid Limit, % | 21.70 | 25.0% Maximum. |
| 2 | Plasticity Index, % | Non Plastic | 6.0% Maximum. |

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Job No.: CTCE/BBMP/W.No.07/KRIDL/SDBC(QB)/2014-15 19.07.2014

## TEST REPORT

| | | |
|---|---|---|
| CLIENT | : | **Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore. |
| AGENCY | : | **Technical Manager (West),** KRIDL, Bangalore. |
| NAME OF THE WORK | : | Improvements to Roads at Ward No.07, Byatarayanapura in Sanjeevanagara, BBMP, Bangalore. |
| REFERENCE | : | AEE/(KOD.SUB.DIV)/67/A/2014-15 Dated: 26.06.2014 |
| SAMPLE ID | : | Bitumen |
| DATE OF TESTING | | 19.07.2014 |

The results of the tests conducted on the bitumen sample using for Semi Dense Bituminous Concrete.

| Sl. No | Description | Test Method as per IS | Test Result | Requirement as per IS:73:2013 |
|---|---|---|---|---|
| 1 | Penetration at 25 °C, 1/10 mm | IS :1203 -1978 (RA-2009) | 93 | 80 to 100 |
| 2 | Softening point, °C | IS :1205 -1978 (RA-2009) | 48 | Min. 40 |
| 3 | Ductility at 27°C, cm | IS :1208 -1978 (RA-2009) | 100 > | Min. 75 |
| 4 | Flash Point, °C | IS :1209 -1978 (RA-2009) | 288 | Min. 220 |

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Job No.: CTCE/BBMP/W.No.07/KRIDL/SDBC/AIV/2014-15 19.07.2014

## Aggregate Impact Value

IS: 2386 Part IV

| | |
|---|---|
| Client | **Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore. |
| Agency | **Technical Manager (West),** KRIDL, Bangalore. |
| Name of the Work | Improvements to Roads at Ward No.07, Byatarayanapura in Sanjeevanagara, BBMP, Bangalore. |
| Reference | AEE/(KOD.SUB.DIV)/67/A/2014-15 Dated: 26.06.2014 |
| Source / Location | Hot Mix Plant, Bangalore |
| Type of Mix | Semi Dense Bituminous Concrete |
| Date of Testing | 19.07.2014 |

| Sl No. | Details | Trial No. 1 | Trial No. 2 | Average |
|---|---|---|---|---|
| 1 | Total weight of aggregate sample filling the cylindrical measure = $W_1$ g | 386 | 388 | |
| 2 | Weight of agregate passing 2.36 mm sieve after the test = $W_2$ g | 85 | 87 | |
| 3 | Weight of aggregate retained 2.36 mm sieve after the test = $W_3$ g | 301 | 301 | |
| 4 | Aggregate Impact value = percent fines 100* ($W_2/W_1$)% | 22.02 | 22.42 | 22.22 |

Comments:

→ Maximum allowable Aggregate Impact value for Semi Dense Bituminous Concrete is 27%

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## Aggregate Impact Value

IS: 2386 Part IV

| | |
|---|---|
| Client | **Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore. |
| Agency | **Technical Manager (West),** KRIDL, Bangalore. |
| Name of the Work | Improvements to Roads at Ward No.07, Byatarayanapura in Sanjeevanagara, BBMP, Bangalore. |
| Reference | AEE/(KOD.SUB.DIV)/67/A/2014-15 Dated: 26.06.2014 |
| Source / Location | Hot Mix Plant, Bangalore |
| Type of Mix | Semi Dense Bituminous Concrete |
| Date of Testing | 19.07.2014 |

| Sl No. | Details | Trial No. 1 | Trial No. 2 | Average |
|---|---|---|---|---|
| 1 | Total weight of aggregate sample filling the cylindrical measure = $W_1$ g | 382 | 385 | |
| 2 | Weight of agregate passing 2.36 mm sieve after the test = $W_2$ g | 83 | 86 | |
| 3 | Weight of aggregate retained 2.36 mm sieve after the test = $W_3$ g | 299 | 299 | |
| 4 | Aggregate Impact value = percent fines<br>100* ($W_2/W_1$)% | 21.73 | 22.34 | 22.03 |

Comments:

→ Maximum allowable Aggregate Impact value for Semi Dense Bituminous Concrete is 27%

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Job No.: CTCE/BBMP/W.No.07/KRIDL/SDBC/Shape_T/2014-15 . 19.07.2014

## DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

| | |
|---|---|
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| Agency | **Technical Manager (West),** KRIDL, Bangalore. |
| Name of Work | Improvements to Roads at Ward No.07, Byatarayanapura in Sanjeevanagara, BBMP, Bangalore. |
| Reference | AEE/(KOD.SUB.DIV)/67/A/2014-15 Dated: 26.06.2014 |
| Technical Reference | IS 2386(Part 1) 1963 (RA 2007) |
| Type of Mix | Semi Dense Bituminous Concrete |
| Date of Testing | 19.07.2014 |

Civil-Tech Consultants & Engineers Bangalore

Result : Flakiness Index = **11.89%**

Elongation Index = **13.54%**

Result : Combined Flakiness & Elongation index **25.43%**

Comments:

→ Maximum allowable Flakiness & Elongation Index for Semi Dense Bituminous Concrete is 30%

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## DETERMINATION OF FLAKINESS INDEX & ELONGATION INDEX OF COARSE AGGREGATES

| | |
|---|---|
| Client | **Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore. |
| Agency | **Technical Manager (West),** KRIDL, Bangalore. |
| Name of Work | Improvements to Roads at Ward No.07, Byatarayanapura in Sanjeevanagara, BBMP, Bangalore. |
| Reference | AEE/(KOD.SUB.DIV)/67/A/2014-15 Dated: 26.06.2014 |
| Technical Reference | IS 2386(Part 1) 1963 (RA 2007) |
| Type of Mix | Semi Dense Bituminous Concrete |
| Date of Testing | 19.07.2014 |

Civil-Tech Consultants & Engineers Bangalore

Result : Flakiness Index = **11.58%**

Elongation Index = **13.79%**

Result : Combined Flakiness & Elongation index **25.37%**

Comments:

→ Maximum allowable Flakiness & Elongation Index for Semi Dense Bituminous Concrete is 30%

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Job No.: CTCE/BBMP/W.No.07/KRIDL/SDBC/Stripping/2014-15 21.07.2014

## Stripping Value of Road Aggregates (Static Immersion Test)

IS: 6241

| | |
|---|---|
| Client | **Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore. |
| Agency | **Technical Manager (West),** KRIDL, Bangalore. |
| Name of the work | Improvements to Roads at Ward No.07, Byatarayanapura in Sanjeevanagara, BBMP, Bangalore. |
| Reference | AEE/(KOD.SUB.DIV)/67/A/2014-15 Dated: 26.06.2014 |
| Type of Mix | Semi Dense Bituminous Concrete |
| Date of Testing | 21.07.2014 |

Type of binder : 80/100
Percentage of binder used : 5.0% by wt.
Total weight of aggregate : 200 g
Total weight of binder : 10.0 g
Temperature of water-bath : 40° C

| Observation Number | Stripping, Percentage | Average, Percentage | Average Retained Coating, % |
|---|---|---|---|
| 1 | 2.7 | 2.90 | 97.10 |
| 2 | 2.9 | | |
| 3 | 3.1 | | |

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Comments:

→ Minimum allowable Aggregate retained coating for Semi Dense Bituminous Concrete is 95%

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Job No.: CTCE/BBMP/W.No.07/KRIDL/Sp_Wa/2014-15 21.07.2014

## Specific Gravity And Water Absorption Test

IS: 2386 Part III

| | |
|---|---|
| Client | **Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore. |
| Agency | **Technical Manager (West),** KRIDL, Bangalore. |
| Name of the Work | Improvements to Roads at Ward No.07, Byatarayanapura in Sanjeevanagara, BBMP, Bangalore. |
| Reference | AEE/(KOD.SUB.DIV)/67/A/2014-15 Dated: 26.06.2014 |
| Type of Mix | Semi Dense Bituminous Concrete |
| Source / Location | Hotmix Plant, Bangalore |
| Date of Testing | 21.07.2014 |

| Sl. No. | Details | Notation | Test Number | | | Mean Value |
|---|---|---|---|---|---|---|
| | | | Test 1 | Test 2 | Test 3 | |
| 1 | Weight of aggregate suspended in water with the basket | $W_1$ g | 1996 | 2009 | 2011 | |
| 2 | Weight of basket suspended in water | $W_2$ g | 755 | 755 | 755 | |
| 3 | Weight of saturated aggregate in water | $(W_1 - W_2) = W_s$ g | 1241 | 1254 | 1256 | |
| 4 | Weight of saturated surface dry aggregate in air | $W_3$ g | 2006 | 2015 | 2016 | |
| 5 | Weight of water equal to the volume of the aggregate | $(W_3 - W_S)$ g | 765 | 761 | 760 | |
| 6 | Weight of oven dried aggregate | $W_4$ g | 1989 | 1996 | 1999 | |
| 7 | Specific Gravity | $W_4/(W_3-W_S)$ | 2.600 | 2.623 | 2.630 | 2.618 |
| 8 | Apparent Specific gravity | $W_4/(W_4-W_S)$ | 2.659 | 2.690 | 2.690 | 2.680 |
| 9 | Water Absorption | $((W_3-W_4)*100)/W_4$ | 0.85% | 0.95% | 0.85% | 0.89% |

Comments:

→ Maximum allowable Aggregate Water absorption value for Semi Dense Bituminous Concrete is 2.0%

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## BITUMEN CONTENT DETERMINATION OF SEMI DENSE BITUMINOUS CONCRETE MIX

**AASHTO T 164**

| | |
|---|---|
| CLIENT | **Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore. |
| AGENCY | **Technical Manager (West),** KRIDL, Bangalore. |
| NAME OF THE WORK | Improvements to Roads at Ward No.07, Byatarayanapura in Sanjeevanagara, BBMP, Bangalore. |
| REFERENCE | AEE/(KOD.SUB.DIV)/67/A/2014-15 Dated: 26.06.2014 |
| SAMPLE I/D | Roads in Sanjeevanagara Ward No.07 BBMP, Bangalore. |
| DATE OF TESTING | 21.07.2014 |

**BITUMEN CONTENT DETERMINATION**

| Description | Trail 1 | Trail 2 |
|---|---|---|
| 1. Weight of Mixture before Test, g | 500 | 500 |
| 2. Weight of Mixture after Test, g | 476.5 | 476 |
| 3. Weight of Asphalt and Mineral matter Extracted, g | - | - |
| 4. Weight of Mineral Matter, g. | - | - |
| 5. Weight of Ash, g | | |
| 6. Weight of Bitumen Extracted, g. (corrected) | 23.5 | 24.00 |
| 7. Bitumen content in % | 4.70 | 4.80 |
| 8. Average | **4.75** | |

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**BITUMEN CONTENT AFTER GRADATION DETERMINATION OF SEMI DENSE BITUMINOUS CONCRETE MIX**

**AASHTO T 30**

| | |
|---|---|
| CLIENT | **Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore. |
| AGENCY | **Technical Manager (West),** KRIDL, Bangalore. |
| NAME OF THE WORK | Improvements to Roads at Ward No.07, Byatarayanapura in Sanjeevanagara, BBMP, Bangalore. |
| REFERENCE | AEE/(KOD.SUB.DIV)/67/A/2014-15 Dated: 26.06.2014 |
| SAMPLE I/D | Roads in Sanjeevanagara Ward No.07 BBMP, Bangalore. |
| DATE OF TESTING | 21.07.2014 |

**GRADATION AFTER EXTRACTION**

| Sieve Size in mm | Trail 1 | | | | Specified Limits as per MORTH specification table 500-4 (Grading-2) |
|---|---|---|---|---|---|
| | Weight Retained, gm | % Retained | %Cummulative Retained | % Passing | |
| 13.2 | 0 | 0 | 0 | 100 | 100 |
| 9.5 | 38.56 | 8.09 | 8.09 | 91.91 | 90-100 |
| 4.75 | 260.7 | 54.71 | 62.80 | 37.20 | 35-51 |
| 2.36 | 54.96 | 11.53 | 74.34 | 25.66 | 24-39 |
| 1.18 | 47.32 | 9.93 | 84.27 | 15.73 | 15-30 |
| 0.3 | 26.58 | 5.58 | 89.85 | 10.15 | 9-19 |
| 0.075 | 27.54 | 5.78 | 95.63 | 4.37 | 3-8 |

| Sieve Size in mm | Trail 2 | | | | Specified Limits as per MORTH specification table 500-4 (Grading-2) |
|---|---|---|---|---|---|
| | Weight Retained, gm | % Retained | %Cummulative Retained | % Passing | |
| 13.2 | 0 | 0 | 0 | 100 | 100 |
| 9.5 | 38.67 | 8.12 | 8.12 | 91.88 | 90-100 |
| 4.75 | 261.3 | 54.89 | 63.02 | 36.98 | 35-51 |
| 2.36 | 57.57 | 12.09 | 75.11 | 24.89 | 24-39 |
| 1.18 | 45.92 | 9.65 | 84.76 | 15.24 | 15-30 |
| 0.3 | 25.63 | 5.38 | 90.14 | 9.86 | 9-19 |
| 0.075 | 24.87 | 5.22 | 95.37 | 4.63 | 3-8 |

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Job No.: CTCE/BBMP/W.No.07/KRIDL/SDBC/Bitumen/2014-15 21.07.2014

## BITUMEN CONTENT DETERMINATION OF SEMI DENSE BITUMINOUS CONCRETE MIX

**AS per IRC : SP : 11 - 1984**

| | |
|---|---|
| CLIENT | **Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore. |
| AGENCY | **Technical Manager (West),** KRIDL, Bangalore. |
| NAME OF THE WORK | Improvements to Roads at Ward No.07, Byatarayanapura in Sanjeevanagara, BBMP, Bangalore. |
| REFERENCE | AEE/(KOD.SUB.DIV)/67/A/2014-15 Dated: 26.06.2014 |
| SAMPLE I/D | Roads in Sanjeevanagara, Ward No. 07 |
| DATE OF TESTING | 21.07.2014 |

### BITUMEN CONTENT DETERMINATION

| Description | Trail 1 | Trail 2 |
|---|---|---|
| 1. Weight of Mixture before Test, g | 500 | 500 |
| 2. Weight of Mixture after Test, g | 474.5 | 475 |
| 3. Weight of Asphalt and Mineral matter Extracted, g | - | - |
| 4. Weight of Mineral Matter, g. | - | - |
| 5. Weight of Ash, g | | |
| 6. Weight of Bitumen Extracted, g. (corrected) | 25.50 | 25.00 |
| 7. Bitumen content in % | 5.10 | 5.00 |
| 8. Average | **5.05** | |

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Job No.: CTCE/BBMP/W.No.07/KRIDL/SDBC/Gradation/2014-15 21.07.2014

## BITUMEN GRADATION DETERMINATION OF SEMI DENSE BITUMINOUS CONCRETE MIX

As per IS : 2386 and IRC : SP : 11 - 1984

| | |
|---|---|
| CLIENT | **Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore. |
| AGENCY | **Technical Manager (West),** KRIDL, Bangalore. |
| NAME OF THE WORK | Improvements to Roads at Ward No.07, Byatarayanapura in Sanjeevanagara, BBMP, Bangalore. |
| REFERENCE | AEE/(KOD.SUB.DIV)/67/A/2014-15 Dated: 26.06.2014 |
| SAMPLE I/D | Roads in Sanjeevanagara, Ward No. 07 |
| DATE OF TESTING | 21.07.2014 |

### GRADATION AFTER EXTRACTION

| Sieve Size in mm | Trail 1 | | | | Specified Limits as per MORTH specification table 500-15 (Grading-2) |
|---|---|---|---|---|---|
| | Weight Retained, gm | % Retained | %Cummulative Retained | % Passing | |
| 13.2 | 0 | 0 | 0 | 100 | 100 |
| 9.5 | 25.13 | 5.30 | 5.30 | 94.70 | 90-100 |
| 4.75 | 257.48 | 54.26 | 59.56 | 40.44 | 35-51 |
| 2.36 | 61.35 | 12.93 | 72.49 | 27.51 | 24-39 |
| 1.18 | 45.98 | 9.69 | 82.18 | 17.82 | 15-30 |
| 0.3 | 27.65 | 5.83 | 88.01 | 11.99 | 9-19 |
| 0.075 | 29.63 | 6.24 | 94.25 | 5.75 | 3-8 |

| Sieve Size in mm | Trail 2 | | | | Specified Limits as per MORTH specification table 500-15 (Grading-2) |
|---|---|---|---|---|---|
| | Weight Retained, gm | % Retained | %Cummulative Retained | % Passing | |
| 13.2 | 0 | 0 | 0 | 100 | 100 |
| 9.5 | 28.65 | 6.03 | 6.03 | 93.97 | 90-100 |
| 4.75 | 263.45 | 55.46 | 61.49 | 38.51 | 35-51 |
| 2.36 | 51.27 | 10.79 | 72.29 | 27.71 | 24-39 |
| 1.18 | 33.65 | 7.08 | 79.37 | 20.63 | 15-30 |
| 0.3 | 28.95 | 6.09 | 85.47 | 14.53 | 9-19 |
| 0.075 | 37.49 | 7.89 | 93.36 | 6.64 | 3-8 |

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Job No.: CTCE/BBMP/W.No.07/KRIDL/SDBC/AGG/2014-15 21.07.2014

## Aggregate Gradation Test

IS : 2386 Part I

| | |
|---|---|
| Client | **Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore. |
| Agency | **Technical Manager (West),** KRIDL, Bangalore. |
| Name of the Work | Improvements to Roads at Ward No.07, Byatarayanapura in Sanjeevanagara, BBMP, Bangalore. |
| Reference | AEE/(KOD.SUB.DIV)/67/A/2014-15 Dated: 26.06.2014 |
| Sample I / D | Hot Mix Plant, Bangalore |
| Type of Mix | Semi Dense Bituminous Concrete (SDBC) |
| Date of Testing | 21.07.2014 |

Total Weight of Sample: 5650 gm

| SIEVE SIZE, mm | Weight Retained, gm | % Retained | Cummulative % Retained | % Passing | Grade-II As per MORTH | Remarks |
|---|---|---|---|---|---|---|
| 13.2 | 0 | 0.0 | 0 | 100 | 100 | Gradation satisfies Grade-II MORTH specification |
| 9.5 | 446 | 7.9 | 7.89 | 92.11 | 90-100 | |
| 4.75 | 2865 | 50.7 | 58.60 | 41.40 | 35-51 | |
| 2.36 | 724 | 12.8 | 71.42 | 28.58 | 24-39 | |
| 1.18 | 495 | 8.8 | 80.18 | 19.82 | 15-30 | |
| 0.3 | 348 | 6.2 | 86.34 | 13.66 | 9-19 | |
| 0.075 | 418 | 7.4 | 93.73 | 6.27 | 3-8 | |

Total Weight of Sample: 5550 gm

| SIEVE SIZE, mm | Weight Retained, gm | % Retained | Cummulative % Retained | % Passing | Grade-II As per MORTH | Remarks |
|---|---|---|---|---|---|---|
| 13.2 | 0 | 0.0 | 0 | 100 | 100 | Gradation satisfies Grade-II MORTH specification |
| 9.5 | 379 | 6.8 | 6.83 | 93.17 | 90-100 | |
| 4.75 | 3027 | 54.5 | 61.37 | 38.63 | 35-51 | |
| 2.36 | 734 | 13.2 | 74.59 | 25.41 | 24-39 | |
| 1.18 | 494 | 8.9 | 83.50 | 16.50 | 15-30 | |
| 0.3 | 246 | 4.4 | 87.93 | 12.07 | 9-19 | |
| 0.075 | 288 | 5.2 | 93.12 | 6.88 | 3-8 | |

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Job No.: CTCE/BBMP/W.No.07/KRIDL/SDBC/Stability/2014-15 21.07.2014

## TEST REPORT ON STABILITY OF MIX

| | | |
|---|---|---|
| Client | : | **Asst. Executive Engineer,** Kodigehalli Sub Division, BBMP, Bangalore. |
| Agency | : | **Technical Manager (West),** KRIDL, Bangalore. |
| Name of the work | : | Improvements to Roads at Ward No.07, Byatarayanapura in Sanjeevanagara, BBMP, Bangalore. |
| Reference | : | AEE/(KOD.SUB.DIV)/67/A/2014-15 Dated: 26.06.2014 |
| Source of location | : | Hot mix Plant, Bangalore |
| Type of Mix | : | Semi Dense Bituminous Concrete |
| Date of Testing | : | 21.07.2014 |

The results of the tests conducted on the bituminous mix sample are as follows:

| Sl. No | Description | Test Result 1 | Test Result 2 | Requirement as per MORTH (Table 500-16) |
|---|---|---|---|---|
| 1 | Marshal Stability, at 60° C, Kn | 10.20 | 10.30 | 8.2 Kn (min) |
| 2 | Marshal flow at 60° C, mm | 2.50 | 2.60 | 2 – 4 |
| 3 | Percent air voids | 3.25 | 4.25 | 3 – 5 |
| 4 | Percent voids in mineral aggregates (VMA %) | 14.10 | 14.20 | 13 - 15 |
| 5 | Percent voids filled with Bitumen (VFB %) | 72.35 | 72.50 | 65 – 78 |
| 6 | Density, g/cc | 2.26 | 2.27 | --- |

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